

**REMARKS**

**Status of the Claims**

Claims 1, 2 and 4-8 are pending in this application. Claim 3 has been canceled. Claims 7 and 8 have been added. Support for claims 7 and 8 is found at page 18, lines 15-23 of the specification. Claim 1 has been amended to incorporate the subject matter of claim 3 into claim 1. No new matter has been added by the above claim amendments.

**Rejection under 35 USC 112, second paragraph**

The Examiner rejects claims 1, 2 and 4-6 as indefinite for the phrase "perfluoroparaffin derivative". Applicants traverse the rejection and respectfully request the withdrawal thereof.

Applicants submit that the phrase "perfluoroparaffin derivative" is not indefinite. Although the phrase is not "defined" *per se*, Applicants submit that the compounds of formula (8) on page 17 of the specification are preferred "perfluoroparaffin derivatives". Moreover, the above claim amendments describe by chemical formula the derivatives contemplated herein. As such, Applicants submit that the claims are not indefinite and the rejection should be withdrawn.

**The Present Invention**

The present invention provides a curable fluoropolyether rubber composition comprising (A) a straight-chain fluoropolyether

compound having at least two alkenyl groups in a molecule and a perfluoropolyether structure in the backbone, (B) an organosilicon compound having at least two silicon atom-bonded hydrogen atoms in a molecule, (C) a perfluoroparaffin or perfluoroparaffin derivative having the general formula (7) and (8) respectively, in powder form which contains at least 80% by weight of a volatile component that volatilizes off when held in a drier at 200°C for 4 hours, and has a melting point of at least 50°C, and (D) a hydrosilylation catalyst.

The curable fluoropolyether rubber composition comprising (A), (B) and (D) above can be easily formed into most shapes. In the case of complex shape parts or thin-wall parts like diaphragms, however, it is difficult to remove the molded composition from the mold because of tackiness. Furthermore, adding the particular additive as typified by bisphenol AF to the composition is effective for improving mold release, but is left in the molding composition as an unnecessary impurity which can have a negative impact on the physical properties, chemical resistance and heat resistance of the molded parts.

In the present invention, when (C) perfluoroparaffin of the general formula (7) or the perfluoroparaffin derivative of the above general formula (8) in powder form which contains at least 80% by weight of a volatile component that volatilizes off when held in a drier at 200°C for 4 hours, and has a melting point of at

least 50°C is incorporated in a fluoropolyether rubber composition comprising above (A), (B) and (D), the resulting composition has improved mold release without having an increase in viscosity. Also, Component (C) is removed as an impurity after heat treatment of the molded parts. Therefore, the resulting composition has excellent physical properties and chemical and heat resistance.

Component (C) of the present invention is an additive that imparts release properties in the molding step without the risk of detracting from the properties of molded parts, since Component (C) can be removed by heat treatment after molding. Component (C) as used in the present invention must be in powder form and have a melting point of at least 50°C. Storage stability requires the additive to have a melting point of at least 50°C.

Furthermore, Component (C) must meet the requirement that when about 1 gram of the material in a dish is held in a drier at 200°C for 4 hours, 80% by weight or more of the material volatilizes off. This is necessary in order that upon heating, the additive migrate through the composition and volatilize off from the surface of the molded part. If the additive is not volatile, it will bloom on the surface of the molded rubber part and degrade the outer appearance of the molded article.

If, on the other hand, a customary liquid internal mold release agent is added to a rubber composition, the resulting composition becomes thickened due to the lack of compatibility

therebetween, and thus difficult to work. Sometimes, the liquid internal mold release agent will separate from the composition during storage.

Rejection under 35 USC 102(b)

The Examiner rejects claims 1-5 as anticipated by Tarumi USP 5,837,774. Applicants traverse the rejection and respectfully request the withdrawal thereof.

Applicants submit that the present invention is not anticipated by Tarumi '774. Tarumi '774 discloses a curable fluoropolyether rubber composition comprising: (A) a straight chain fluoropolyether compound having two alkenyl groups in its molecule and having a divalent perfluoropolyether structure in its backbone chain, (B) a polytetrafluoroethylene, (C) an organohydrogenpolysiloxane having at least two hydrogen atoms bonded to silicon atoms in its molecule, and (D) a hydrosilylation reaction catalyst.

Applicants submit that Tarumi fails to disclose component (C) of the present invention, a perfluoroparaffin or perfluoroparaffin derivative of formula (7) and (8), respectively. Contrary to the Examiner's statement that "Component (B) and Applicant's Component (C) both should have the same properties such as powder form volatility, etc," Applicants submit that Component (B) of Tarumi '774 is a polytetrafluoroethylene, preferable

polytetrafluoroethylene, which includes a homopolymer having a molecular weight of at least 2,000, particularly about 2,000 to 5,000,000, and a telomer having a molecular weight of about 2,000 to 5,000,000 obtained by polymerizing tetrafluoroethylene in the presence of a telogen. Please see column 5, lines 4-13 of Tarumi '774. Tarumi '774 uses a trichlorotrifluoroethane dispersion (tradename: Vydax 1000, produced by E.I. du Pont de Nemours and Co.) of a tetrafluoroethylene telomer (average particle diameter: about 5  $\mu$ m) having a molecular weight of 25,000 as Component (B) in the Example.

Component (B) of Tarumi '774 has a greater molecular weight and thus, cannot meet the requirement that at least 80% by weight of the material volatilizes off when held in a drier at 200°C for 4 hours. This property is a necessary condition in order that upon heating, the additive migrates through the composition and volatilizes off from the surface of the molded part. Instead, Component (B) of Tarumi '774 is left in the molding composition to improve the lubricating qualities of the composition. Please see for example, Example 1, Comparative Example 1, and Comparative Example 2 in the Tarumi '774 specification, and the following description disclosed at page 17, line 24 - page 18, line 2 of the present specification:

The compound of formula (7) wherein  $x = 10$  has a melting point of 75°C. Those compounds of formula (7)

wherein x is less than 10 have a melting point below 50°C and thus does not take powder form so that they are melted into the polymer of Component (A), causing a viscosity increase. The high molecular weight compounds of formula (7) wherein x is more than 40 are difficult to migrate through the rubber and volatilize off from the surface during heat treatment.

The compounds of formula (8) wherein y = 2 have a melting point which varies with the identity of R. Because of a lower fluorine content, those compounds of formula (8) wherein y is less than 2 are difficult to migrate through the rubber to reach the surface during heat treatment, failing to exert the mold release effect. Those compounds of formula (8) wherein y is more than 40 are difficult to migrate through the rubber and volatilize off from the surface during heat treatment.

Applicants submit that clearly the compound of formula (7) wherein x is a number in the range of 10 to 40 has molecular weight 638-2138, the compound of formula (8) wherein y is a number in the range of 2 to 40 has molecular weight 184-2490 are not disclosed or suggested in Tarumi '774. Thus, Tarumi '774 fails to disclose Component (C) of the present invention. As such, this rejection should be withdrawn for failure to establish a *prima facie* case of anticipation.

**Rejection under 35 USC 103(a)**

The Examiner rejects claim 6 as obvious over Tarumi '774 in view of Matsuda USP 6,160,074. Applicants traverse the rejection and respectfully request the withdrawal thereof.

Applicants rely on the arguments above regarding the deficiencies in Tarumi '774. Tarumi '774 fails to disclose or suggest component (C) of the present invention. The Examiner relies on Matsuda '074 for disclosing a use of the curable fluoropolyether rubber for sealing members and O-rings. Matsuda '074 fails to disclose component (C) of the present invention. Thus, Matsuda '074 fails to compensate for the deficiencies in Tarumi '774. As such, Applicants submit that no prima facie of obviousness has been established since the combination of references fails to disclose or suggest all of the elements of the present invention. As such, Applicants respectfully request that this rejection be withdrawn.

**Conclusion**

As Applicants have addressed and overcome all rejections in the Office Action, Applicants respectfully request that the rejections be withdrawn and that the claims be allowed.

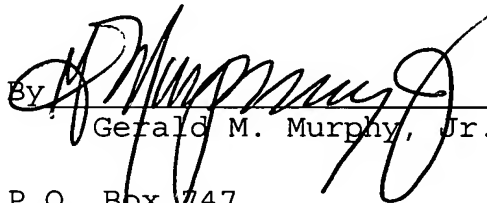
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Kecia Reynolds (Reg. No. 47,021) at the

telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

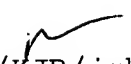
If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By:  \_\_\_\_\_  
Gerald M. Murphy, Jr. #28,977

P.O. Box 747  
Falls Church, VA 22040-0747  
(703) 205-8000

  
GMM/KJR/jmb  
0171-1037P

Attachment(s) :